

State of Oregon
Department of Environmental Quality

Memorandum

Date: September 18, 2012

To: Sheila Monroe, Manager
Eastern Region Cleanup Program

From: Bob Schwarz, Project Manager
Eastern Region Cleanup Program

Subject: Northwest Aluminum ECSI # 4793; Response to comments regarding proposed No Further Action determination

DEQ issued a public notice on May 8, 2012 regarding our intention to issue a conditional No Further Action (NFA) determination for the Northwest Aluminum site. Comments were provided in the following documents:

- May 23, 2012 letter from Deb Yamamoto, US Environmental Protection Agency
- May 23, 2012 letter from Brad Owens, Lockheed Martin
- May 23, 2012 letter from Donna Florom, Arcadis
- May 23, 2012 email from Lynden Peters, Arcadis:
- May 23, 2012 email from Marsha Walker, PBS Engineering & Environmental

This memo provides responses to those comments. Comments are shown below in bold type, followed by DEQ's responses in plain type. These comments and responses refer to DEQ's May 2012 staff report and CH2M HILL's March 2012 *Remedial Investigation, Risk Assessment, and Remedial Action Report*.

Both documents are available at: <http://www.deq.state.or.us/lq/ECSI/ecsi.htm>

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Figures and tables referred to in this memo are found in the March 2012 CH2M HILL report.

MAY 23, 2012 LETTER FROM DEB YAMAMOTO, US ENVIRONMENTAL PROTECTION AGENCY

The EPA has had an opportunity to review ODEQ's proposed No Further Action determination for work conducted by NAC to remediate contaminated soils at NAC's former plant located in the City of Dalles, Oregon. The EPA reviewed the *Final Report Remedial Investigation, Risk Assessment, and Remedial Action Report Northwest*

Aluminum Company, March 2012, prepared for Ater Wynne, LLP by CH2M HILL, and the Staff Report, Recommended No Further Action for Northwest Aluminum Company, The Dalles, Oregon, ECSI # 4793, May 2012, prepared by ODEQ, Eastern Region. Based on the EPA's review of these documents, the EPA objects to the ODEQ proposed NFA determination for NAC.

The former NAC plant and NAC property is part of a site that was listed on the National Priorities List as a priority site for remedial evaluation and response under the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. §§ 9601 to 9675. Although the site was delisted, the site remains subject to CERCLA. Work conducted at the site, notwithstanding the delisted status, must still meet the performance standards and cleanup levels established in the Record of Decision for the site. Because the remedial action for the site resulted in hazardous substances, pollutants, contaminants remaining on the site, CERCLA requires a review of the site no less than every five years. Section 121(c) of CERCLA, 42 U.S.C. § 9621(c). The site is also subject to a federal judicial consent decree to which the State of Oregon is a party. The CD cannot be modified except by written approval of all parties. The federal party to the CD is the United States of America and to date the USA has never provided written approval for any change to the CD. The CD requires compliance with the ROD and the Scope of Work for the remedial action.

Response: EPA issued a certification of completion on February 10, 1995, determining that the remedial work required by the 1988 Record of Decision (ROD) had been satisfactorily performed. The ROD did not require decommissioning or cleanup of the active aluminum plant then located at the site. DEQ disagrees that this post-certification work was subject to the ROD or federal consent decree. DEQ is not proposing through the NFA to modify the consent decree.

After reviewing the voluntary cleanup work conducted by NAC at the site under ODEQ's supervision, the EPA objects to the proposed NFA based on the following comments:

1. The screening levels used for work conducted by NAC for soils and groundwater appear to be less stringent than the levels required by the CD and ROD for the site.

Response: The cleanup recently completed at this site consisted primarily of excavation and offsite disposal of contaminated soil. Screening levels were based on current DEQ rules and guidance. The soil screening levels used are more stringent than those in the ROD for arsenic and polynuclear aromatic hydrocarbons (PAHs) and less stringent than that in the ROD for fluoride.

For drinking water, EPA has established a maximum concentration level (MCL) of 4 milligrams per liter (mg/L) for fluoride. The ROD specifies an alternate concentration limit (ACL) of 9.7 milligrams mg/L. Fluoride concentrations in some S-aquifer groundwater samples exceed both

the ACL and the more stringent MCL. As stated in our staff report, we determined that the S aquifer is not a drinking water aquifer, based on current and reasonably likely future use. Fluoride in the underlying A and B aquifers, based on extensive sampling in the 1990s, is less than 1 mg/L. We therefore conclude that residual fluoride in groundwater does not exceed acceptable risk levels.

As discussed in section 4.5.5 of the DEQ staff report, the following S aquifer screening levels were established:

- Free cyanide: 0.2 mg/L. This screening value is based on the conservative assumption that no attenuation occurs between the S and A aquifers. The primary MCL for free cyanide is 0.2 mg/L.
- Fluoride: 72 mg/L. As fluoride has not been detected above approximate background levels in the lower aquifers, the highest historical concentration of fluoride detected in the S aquifer (72 mg/L) is considered protective of the lower aquifers. The primary MCL for fluoride is 4 mg/L.
- Sulfate: 3,020 mg/L. Sulfate has been detected above approximate background concentrations in the lower aquifers, but not above the secondary MCL of 250 mg/L. So the highest historical concentration of sulfate in the S aquifer (3,020 mg/L) is considered protective of the lower aquifers.

2. The screening level selected for fluoride, 72 mg/L, exceeds the ACL of 9.7 mg/L and exceeds the MCL of 4 mg/L (2 mg/L) federal standard and the 1.4-2.4 mg/L state MCL. The screening level for sulfate, 3,200 mg/L, is set at the ACL but the EPA expects this level to be revised as an action following the completion of the 4th Five Year Review.

Response: The screening level for fluoride applies to the shallow aquifer (the S aquifer). Based on the beneficial water use determination conducted for this site, this aquifer is not used for drinking, nor is drinking water use reasonably likely in the future. The screening value selected, 72 mg/L, is based on the maximum fluoride concentration found in the S aquifer historically. Extensive groundwater monitoring data has shown that contamination in the S aquifer has not resulted in levels above the MCL in underlying aquifers. We therefore conclude that residual fluoride in the S aquifer groundwater is below acceptable risk levels, as defined in OAR 340-122-0115.

Sulfate was found at a maximum concentration of 870 mg/L in the Northwest Aluminum wells (see Table 6-8b), below the 3,020 screening level specified in the ROD.

3. Although the conclusions made concerning the "S" aquifer regarding the aquifer serving as recharge to the A and B drinking water aquifers mirror the conclusion in the ROD, the documents supporting the NFA seem to indicate that restriction of the aquifer is not needed because future installation of groundwater wells on site is not likely to occur. Restrictions are mandated by the CD and the ROD and must be maintained.

Response: Although we consider it very unlikely that S-aquifer groundwater would be used for drinking, NAC has agreed to implement a deed restriction prohibiting this use.

4. Several areas of work conducted by NAC need further clarification before the EPA can evaluate whether work conducted is protective and consistent with the ROD and Consent Decree:

a. How was the concrete from NAC characterized as "clean fill" and where was the concrete placed?

Response: OAR 340-093-0030(16) defines clean fill as “material consisting of soil, rock, concrete, brick, building block, tile or asphalt paving, which do not contain contaminants which could adversely impact the waters of the State or public health. This term does not include putrescible wastes, construction and demolition wastes and industrial solid wastes.”

To evaluate whether the concrete contained contaminants that could adversely impact the waters of the State or public health, DEQ required testing of total and leachable contaminant concentrations. This is discussed in detail in the response to the Lockheed Martin comments, below. We conclude that contaminant concentrations are sufficiently low so that the clean fill criteria are met.

b. The March 2012 CH2M HILL document refers to soil removal and capping conducted in numerous areas. Clarify all areas where soil was removed and capped, the contamination levels in the material removed and soils remaining on site, the design of the caps, and the controls that will be needed to maintain the caps. Caps used in these areas need to be consistent with soil caps constructed as part of the ROD and must be maintained consistent with the operations and maintenance (O&M) Plan for the site. If soil caps were not constructed to meet these parameters, additional work may be needed to ensure consistency with the ROD and O&M Plan.

Response: There are three areas on the site where excavations were filled with clean fill to limit exposure to residual contamination. These areas are:

- The cast house shaft within the former smelter building,
- The ore unloading area (Area R)
- The drainage channel (Area Y)

Because contaminant information is extensive, not all of it is reproduced here. In some cases, this memo identifies where in the March 2012 CH2M HILL report this information can be found.

Cast house shaft. Decommissioning of the smelter building included removal of PCB-contaminated oil and water that was found in hydraulic lift pits in the cast house, at the southern end of the smelter building. Northwest Aluminum discovered oil and water in the hydraulic lift

pits. This liquid contained PCBs at concentrations of between 50 and 500 mg/L. Concrete sample results are presented in Appendix G of the CH2M HILL report. Following removal of the oil and water, the pits were filled with concrete and controlled-density fill. As required under 40 CFR 761.61(a)(8), a deed notice was filed with Wasco County identifying the location of the capped PCB cleanup area, which covers approximately 750 square feet. This work was approved by EPA, which did not specify O&M requirements. (The May 21, 2009 approval letter from EPA is included as the first page of Appendix G in the CH2M HILL report.) DEQ agrees that O&M requirements are not necessary for this area. The Remedial Action Construction Report for the Martin Marietta Superfund site does not specify O&M requirements for this type of feature.

Ore unloading area (Area R). Contaminant concentrations in this area are represented by two samples shown in Table 6-5. As described in section 8.1.1 of the CH2M HILL report, this area was a pit approximately 10 feet deep. The bottom 8 feet was backfilled with controlled-density fill (a cement-aggregate mixture). The top two feet of backfill was soil and gravel. A deed notice is being prepared to advise future owners of the location of this area. We do not believe O&M requirements are needed for this area, nor does the Remedial Action Construction Report for the Martin Marietta Superfund site specify O&M requirements for this type of feature.

Discharge channel (Area Y). Initial sample results for this area are shown in Table 6-5. Residual contaminant concentrations are shown in Tables 8-4 and 8-7. Sample locations are shown on Figure 8-3. Approximately 457 tons of contaminated soil was excavated and disposed of at an offsite landfill. A small amount of soil with elevated PAHs remains, embedded within fractured rock at the bottom of the excavation. Stormwater and non-contact cooling water from Northwest Aluminum Specialties flow through this ditch on its way to the Columbia River. To prevent potential contamination of this water, DEQ and NAC decided to cover the bottom and sides of this channel with 4-inch rock. A nonwoven geotextile was placed along the bottom and sides of the channel, sandwiched between soil with maximum particle size of ½ inch. The 4-inch rock was placed above the geotextile. The thickness of the layer of 4-inch rock along the bottom of the channel was approximately 3 feet. Six to 12 inches of this rock was placed along the sides of the channel.

The Remedial Action Construction Report for the Martin Marietta Superfund site does recommend clearing debris and sediment from drainage channels. This requirement would apply regardless of the presence of contamination, so that flow capacity of the channel is maintained.

EPA states that “caps used in these areas need to be consistent with soil caps constructed as part of the ROD”. The ROD specifies a multi-layer cap, including a geomembrane, for the CERCLA Landfill, and a vegetated soil cover for scrubber sludge ponds 2 and 3. The ROD does not refer to caps or cover for other portions of the site. Neither the cap for the CERCLA Landfill nor the soil cover for the scrubber sludge ponds is applicable to the three areas described above. These areas are covered with three or more feet of clean fill, and DEQ considers these barriers to be protective.

c. The ROD prohibited disturbance of asbestos disposal areas. Clarify if any asbestos

disposal areas were disturbed and provide additional information on activities conducted on asbestos disposal areas, if any.

Response: The asbestos disposal areas mentioned in the ROD are within the capped CERCLA landfill, which is on Lockheed Martin property. Northwest Aluminum did not do work in this area.

d. Provide a clarification on work done on small portions of the scrubber sludge ponds that "extended onto property owned by NAC" and include information on the title to the real property.

Northwest Aluminum collected soil samples in this area, but did not do any soil removal. They and Lockheed Martin are in discussions about revising the property line so that this area is within the Lockheed Martin property boundary.

e. The following "features of interest" on and at which NAC appears to have conducted work seem to include multiple areas addressed by the CD and ROD and 1994 explanation of significant differences (ESD) to the ROD. Any work conducted in these areas may require an additional ESD or ROD amendment. Clarify the work locations and summarize the work conducted for the following FOIs-D (old cathode waste pile area), H (salvage area), I (part of salvage area and wash), J (cathode waste area), W (landfill runoff areas), X (former scrubber sludge pond), R (unloading area), U (recycle pond aka storm water surge pond), Y (discharge channel), and S (lined pond).

Response: Soil sampling was conducted in all the areas mentioned in this comment except area U (stormwater surge pond). Sampling was not done there because no industrial activity has taken place in this area since the remedial actions taken in 1991. Note that sampling in area X was limited to the area outside the fenced scrubber sludge ponds. The property line that was intended to include the entire scrubber sludge pond areas appears to have inadvertently omitted small portions of this area, as shown in Figure 5-1.

Soil excavation areas are shown in Figure 8-3. The primary reason for this soil removal was to reduce PAH concentrations to acceptable risk levels. A review of this figure along with Figure 5-1 illustrates which features of interest (FOIs) were included in areas where soil was excavated. Of the areas mentioned in the comment, soil excavation was conducted in the following areas, or "features of interest":

- H - salvage area,
- I - cathode wash area,
- J - wastewater treatment plant (Note: the comment refers to feature of interest J as the "cathode waste area"; based on a review of the ROD and the 1988 Remedial Investigation report, we do not see reference to this area as a cathode waste area.)
- Y – discharge channel

In the course of regrading the site, clean fill was placed over much of it, including areas where soil was excavated to reduce contaminant concentrations. Areas where clean fill was placed over contamination for the purpose of reducing the risk of exposure are limited to areas R, Y and the cast house shaft, as described in the response to 4b.

f. "Hot spots" identified in section 8 of the March 2012 CH2M HILL document include FOIs R, J, E, F, G, C, A, and Y, each of which appears to have been an area included in the ROD. Additional work in these areas may require an additional ESD or ROD amendment. For these 'hotspots', please clarify the risk levels and scenarios and explain how these compare to the CERCLA numbers for the site, the contaminants of concern addressed and explain if the list matches the COCs in the ROD.

Response: Hot spots were identified in several areas based on soil concentrations of five carcinogenic PAH compounds. The portion of the hot spot definition in OAR 340-122-115(32) that applies in this case concerns a concentration in soil of a carcinogen that is 100 times the acceptable risk level for human exposure. The acceptable risk level is based on occupational exposure. Acceptable risk levels and hot spot concentrations are shown below:

PAH compound	RBC for occupational exposure, mg/kg	Hot spot concentration (acceptable risk level x 100), mg/kg
Benzo(a)anthracene	2.7	270
Benzo(a)pyrene	0.27	27
Benzo(b)fluoranthene	2.7	270
Dibenz(a,h)anthracene	0.27	27
Indeno(1,2,3-cd)pyrene	2.7	270

The ROD specifies a remediation criterion of 175 mg/kg for PAHs. Note that under Oregon law, highly-concentrated "hot spots" are locations where contaminant concentrations (for carcinogens) exceed 100 times the acceptable risk level for relevant exposure scenario(s). "Hot spots" in Oregon are assigned a higher preference for remediation and/or treatment than other areas of contamination. However, the overall risk level that the Department required to be met at this site is based on an excess cancer risk of one in one million. This standard leads to cleanup levels, for example for benzo(a)pyrene (0.27 mg/kg), well below the risk level for total PAHs stipulated in the ROD (175 mg/kg). The ROD does not provide remediation criteria for individual PAH compounds.

g. The statement on page 5-2 of the March 2012 CH2M HILL document states that the former cathode area was not the subject of CERCLA remedial action and continued to be used after the CERCLA completion document of 1996. Page 42 of the ROD shows specific action taken at the former cathode area to remove the material

and place it in the CERCLA landfill. Clarify the statement on page 5-2 and the area addressed and explain the action taken. Continued use of this area was not anticipated by the ROD and this work may require either an ESD or a CD amendment.

Response: This appears to be a misunderstanding due to similarity in place names. Two features are described in Section 5 with similar names:

- Feature D: Former Cathode Handling Area
- Features E, F, and G: Former Cathode/Anode Handling Area

Both EPA's comment and the CH2M HILL report text for Feature D (Table 5-1, page 5-2) note that the Cathode Handling Area was remediated by excavation during the CERCLA remedial action and backfilled.

However, CH2M HILL's understanding of the work completed during the CERCLA remediation is that it did not include remedial work at Features E, F, and G, which were not waste management areas but were instead process areas used to produce materials used in the reduction pots. The text referenced in EPA's comment is the summary description for Features E, F, and G.

Figure 10-1 of the 1992 Construction Completion Report shows the excavation area for the former Cathode Handling Area as not including the features labeled in the Northwest Aluminum Report as Features E, F, and G.

5. The conclusion on page 9-15 of the March 2012 CH2M HILL document that "no risk is associated with the groundwater pathway" and the exclusion of the groundwater pathway from the final Human Health Risk Assessment (HHRA), is insupportable. The "no risk" finding must be based on the CERCLA remedy and institutional controls that are supposed to be in place as part of that remedy. There is risk, as identified in the ROD, which is addressed by the ICs. The ICs must be in place for the entire site and constitute an action. The groundwater monitoring network must also remain in place. If the groundwater monitoring network has been disturbed, removed or partially removed, replacement of the network is necessary.

Response: The conclusion contained in the risk assessment is based on reasonable assumptions about potential exposure to groundwater consistent with the Oregon Department of Environmental Quality's beneficial use process (provided by Oregon Administrative Rule 340-122-0080(6) and described by the Department's final *Guidance for Conducting Beneficial Water Use Determinations at Environmental Cleanup Sites*). Given the beneficial use determination proposed by Northwest Aluminum and accepted by the Department, we conclude that risk associated with the potential exposure pathways associated with identified beneficial uses will not exceed acceptable risk levels. As part of the site closure process for Northwest Aluminum, institutional controls prohibiting groundwater use for drinking water purposes are being implemented.

The groundwater monitoring network identified in the ROD and modified by subsequent Sampling and Analysis Plans for the Lockheed Martin site has not been disturbed and will remain in place

6. The ecological exposure pathway in the March 2012 CH2M HILL document concludes that only one pathway was complete. This conclusion does not seem supportable in light of the herd of deer observed on site earlier this year and evidence that other animals inhabit the site. Explain why the stormwater pathway is not deemed complete for ecological.

Response: The ecological risk assessment identified ingestion, food chain effects, and dermal contact as potential exposure routes for terrestrial ecological receptors in Area W. Of the areas for which a No Further Action determination was requested by Northwest Aluminum, this is the one area of the site with sufficient habitat to support these receptors. Ecological receptors and habitat are present on the southern portions of the Northwest Aluminum property, but these areas are not included in the area for which a No Further Action determination was requested.

The stormwater pathway does have the potential to convey contaminants to the Columbia River. Stormwater that flows to the river is conveyed through one outfall permitted by DEQ's Water Quality Program. Sampling results from this outfall indicate that contaminant concentrations do not present unacceptable risk to aquatic receptors in the river.

Although the site is currently vacant, it is zoned for industrial use. We anticipate that the site will be redeveloped and subsequent daily use will make the site less attractive to wildlife for habitat.

7. Waste has been left in place at NAC and controls to maintain and restrict access to capped areas are necessary. At a minimum, ICs are essential for the site. ICs are an action. Consequently, a NFA determination is inappropriate for the site. The nomenclature suggests that there are no restrictions on property use and that waste has not been left onsite. Because property use will be restricted and waste has been left onsite, action as the EPA defines that term is ongoing and will remain ongoing as long as waste remains onsite.

Response: Contaminants remain at the site. The amount of contamination is much less than was allowed in the 1988 ROD. This is primarily because the recent cleanup was based on more stringent cleanup levels for PAH compounds than are reflected in the ROD. Much of the residual contamination has been covered with clean fill in the course of site regrading. As noted above, there are three areas (cast house shaft, ore unloading area, and the stormwater discharge channel) where clean fill was placed over contamination to prevent exposure to relatively small quantities of soil with elevated concentrations of PAHs. Apart from these areas, soil sample results indicate that residual risk has been reduced to acceptable risk levels, as defined in OAR 340-122-0115.

As noted, we intend to implement some institutional controls as described in our staff report. We often require these as conditions of a No Further Action determination. EPA regards these as actions, and therefore disagrees with our use of the term No Further Action. DEQ will modify the document by referring to it as a Conditional NFA determination.

A DEQ No Further Action determination is a technical conclusion that the site does not exceed acceptable risk levels, as defined in Oregon statute, rules and guidance.

The EPA appreciates the desire to move towards redevelopment of sites when appropriate. At this time, however, the EPA cannot determine whether redevelopment is appropriate at this site based on the work conducted by NAC. Consequently, without additional information on the actions taken at each specific location, contaminant concentrations remaining in site soils (e.g., fluoride), and other information needs identified above, the EPA objects to a NFA determination for the site at this time. Should the EPA's concerns be addressed in the future for the site, the EPA would theoretically be in a position to support redevelopment of the site provided such redevelopment is protective of both human health and the environment.

Response: DEQ has considered EPA's comments and appreciates their "support of redevelopment of the site provided such redevelopment is protective of both human health and the environment". DEQ agrees that reuse must be protective of both human health and the environment. Although our responses may, or may not, resolve EPA concerns, we have not identified environmental issues which would prohibit a DEQ No Further Action determination.

LOCKHEED LETTER, MAY 23, 2012

Lockheed Martin Corporation ("Lockheed Martin") objects to the Oregon Department of Environmental Quality's ("DEQ") proposed No Further Action ("NFA") determination for the Northwest Aluminum Company ("NAC") site located at The Dalles, Oregon, at 3313 West Second Street, ESCI No. 4793 ("Site"). As revealed by NAC's own investigation, fluoride remains at the Site at levels in excess of cleanup standards imposed by the United States Environmental Protection Agency's ("EPA") 1988 Record of Decision and 1999 Consent Decree, a condition caused by NAC's Site operations. DEQ's proposed NFA determination would directly conflict with EPA's conclusions and undermine EPA's ability to ensure the integrity of the existing remedy for the Site. DEQ should not issue an NFA determination for the Site at this time.

Response: In one of the four monitoring wells installed by Northwest Aluminum, fluoride was in excess of both the MCL (4 mg/L) and the ACL (9.7 mg/L). For reasons stated above, we conclude that this does not exceed acceptable risk levels because the S aquifer is not currently or reasonably likely to be used as drinking water. The recent removal and offsite disposal of an extensive amount of contaminated soil may reduce the risk of fluoride

migration to groundwater. The extent to which this contaminated soil was due to activities before or after Northwest Aluminum began operations is not known, although the 1987 CERCLA RI report documented that spent pot liner (a source of soluble fluoride and cyanide) was stored outside and exposed to precipitation from 1958 to 1963, and again from 1968 until spent potliner was listed as a state hazardous waste by the Department in 1983. After this time, potliner management activities were modified to reduce the potential for releases to the environment.

Site Operational History

The Site is part of a larger facility historically used for aluminum operations. Harvey Aluminum, Inc., ("Harvey Aluminum") began operating an aluminum smelter at the facility in the late 1950s. Harvey Aluminum became Martin Marietta Aluminum, Inc., ("MMA") in 1972 as a result of a series of stock purchases by Martin Marietta Corporation ("MMC"). MMA, an MMC subsidiary, owned and operated the facility until 1984.

MMA transferred the facility to MMC in 1984. In late 1986, MMC entered into an agreement to lease and then sell the facility to NAC. NAC purchased most of the facility in 1990 and 1991, which it continued to utilize for aluminum operations until entering bankruptcy under Chapter 11 of the United States Bankruptcy Code in 2003. As a result of the bankruptcy, NAC now claims to be "a separate legal entity from the former Northwest Aluminum Company" but continues to own the Site. Lockheed Martin understands that NAC is attempting to sell the Site to an unrelated entity for an unknown purpose, which prompted NAC's request for an NFA determination.

Lockheed Martin's Remediation

EPA placed the facility, which included the Site, on the National Priorities List ("NPL") in 1986. MMC subsequently conducted an extensive CERCLA remediation pursuant to a 1988 Record of Decision and a 1989 Consent Decree entered by EPA, DEQ, MMC, and Commonwealth Aluminum Corporation. In relevant part, the Record of Decision requires maintenance of fluoride levels at the facility's shallow S-Aquifer at or below 9.7 mg/L and requires Lockheed Martin to consider remedial action if this criterion is exceeded. The S-Aquifer extends under and is impacted by the portion of the facility subject to the proposed NFA determination; thus, the 9.7 mg/L action level applies to Lockheed Martin within this area.

EPA issued a certificate of completion to MMC in 1995 and removed the facility from the NPL in 1996. Following delisting, MMC (then Lockheed Martin) continued to perform post-closure operation, maintenance, and monitoring ("OM&M") under EPA's direction. EPA transferred oversight responsibilities to DEQ in 2004 under a Memorandum of Understanding ("MOU") between the agencies; however, EPA retains ultimate authority.

Lockheed Martin and its contractor continue to perform the OM&M activities specified in EPA's 1988 Record of Decision, primarily groundwater monitoring, landfill inspection, and leachate collection and treatment, under a DEQ-issued RCRA permit. In 2010, DEQ conducted its fourth five year review for the facility. EPA commented on the review on March 30, 2012. With respect to fluoride, EPA found:

The use of Alternate Concentration Limits (ACLs) for fluoride in the S-Aquifer does not now appear to be appropriate based on EPA's legal interpretation of use of ACLs outlined in the attached 2005 Memo. In addition, EPA's Groundwater Restoration Policy of 2009 outlines the expectation of returning groundwater to beneficial reuse based on use of drinking water standards such as Maximum Contaminant Levels (MCLs). This issue was raised in the Third Five Year as an action item and has not yet been addressed. Based on these policies, the appropriate comparison criteria for the monitoring recommended in Comment No. 3 above should be based on the 4 ug/L MCL for fluoride, rather than the 9.7 ug/l ACL in the current ROD.

Response: Although there are ongoing discussions about the applicability of MCLs in this area, a DEQ No Further Action determination is a technical conclusion that a site meets acceptable risk levels based upon current Oregon statutes, rules and guidance. (Note: the units for the MCL and ACL numbers shown in the preceding paragraph are actually milligrams per liter, not micrograms per liter.)

Northwest Aluminum's Request for NFA

NAC has been performing demolition and investigation at the Site since 2007 for the singular purpose of attaining an NFA determination from DEQ. As part of its investigation, NAC documented S-Aquifer fluoride levels up to 34.6 mg/L in newly installed monitoring wells beneath the footprint of the main potliner building, and up to 64.1 mg/L in a sump sample. The report attributed the elevated fluoride in the sump to recent operations, stating that:

The only sample exceeding the screening level for fluoride (57 mg/L) was detected in the former west Aluminum Reduction building sump at a concentration of 64.1 mg/L. This sample may have been a mixture of Perched Aquifer water and roof runoff, and likely contained some fluoride-enriched dust from materials handled within the reduction building, such as cryolite (which is 79.2 percent fluoride by weight).

NAC's recent investigation also documented that fluoride in soil ranges up to 23%, with the maximum soil hot spot very close to where a sump sample exhibited a concentration of 64.1 mg/L. This indicates that NAC's recent management of fluoride-bearing cryolite has impacted soil and groundwater. The report also documents that NAC disposed of concrete from the demolished aluminum processing building within the former aluminum production building footprint after receiving DEQ approval. Fluoride in

leach tests of this concrete ranged up to 59.7 mg/L (December 31, 2008 memo from CH2M Hill to DEQ). The similarity between this value and the maximum values measured in site groundwater (34 to 64 mg/L) suggest that the concrete disposal action has caused or exacerbated the fluoride groundwater plume.

Response: The commenter incorrectly states that “fluoride in soil ranges up to 23%”. It is true that the highest fluoride concentration found in soil was 230,000 mg/kg, or 23 percent. However, soil represented by this sample was removed from the site, along with 97,000 tons of hazardous and nonhazardous waste. Following removal of contaminated soil, fluoride at this location was reduced to 6,380 mg/kg at a depth of 0.5 feet and 604 mg/kg at a depth of 2 feet. Results are found in Table 8-5

The amount of contaminated soil due to activities before or after Northwest Aluminum began operations is not known.

Regarding the concrete that was used as backfill material, OAR 340-093-0030(16) defines clean fill as “material consisting of soil, rock, concrete, brick, building block, tile or asphalt paving, which do not contain contaminants which could adversely impact the waters of the State or public health. This term does not include putrescible wastes, construction and demolition wastes and industrial solid wastes.”

To evaluate whether the concrete contained contaminants that could adversely impact the waters of the State or public health, DEQ required testing of total and leachable contaminant concentrations. The commenter states that “fluoride in leach tests of this concrete ranged up to 59.7 mg/L” This is from a December 31, 2008 memo (Appendix A-6 in the CH2M HILL report).

This result is discussed below in the context of the entire dataset. As described in the 2008 memo, ten samples were collected from stockpiles of crushed concrete and analyzed for total fluoride and leachable fluoride by the synthetic precipitation leaching procedure (SPLP). Results are shown below:

total fluoride, mg/kg	SPLP fluoride, mg/L
4.83 U	0.298
11.4	1.28
84.5	59.7
4.94 U	0.137
16.6	3.7
4.92 U	0.319
4.96 U	0.684
4.98 U	0.617
4.93 U	0.944
4.84 U	0.623

These results indicate that fluoride in concrete is quite low. Seven of the ten samples had no detectable fluoride. (The U qualifier indicates that fluoride was less than the lab's ability to detect it.) The highest of the ten samples was 84.5 mg/kg. For comparison, note that the 1988 ROD specified a cleanup level for fluoride in soil of 2,200 mg/kg.

These results indicate that the sample with 84.5 mg/kg total fluoride had 59.7 mg/L leachable fluoride. The other nine samples had leachable fluoride levels that are below the MCL of 4 mg/L.

One of the reasons for this sampling was to estimate a ratio of total to leachable fluoride. The December 31, 2008 memo discusses several reasons why this data set is not useful for this purpose. One is that such a ratio cannot be calculated for the seven samples for which total fluoride is not detected. Another is that, because of a faulty sampling procedure in the lab, the total fluoride samples did not correspond completely with the leachable fluoride samples.

Because of this, Northwest Aluminum collected core samples that were drilled from various floors and walls of the smelter building. These were analyzed for total and leachable fluoride. Results are shown below:

total fluoride, mg/kg	SPLP fluoride, mg/L
899	1.51
469	0.69
665	0.93
803	2.36
3,120	54.6
926	1.19
498	1.16
520	1.63
900	5.28

Total fluoride is higher in this dataset, probably because all the samples included the floor and wall surfaces, which were exposed to contaminants from industrial activities. One of the samples exceeded the ROD cleanup level of 2,200 mg/kg. Leachable fluoride from this sample, 54.6 mg/L, was considerably higher than for the other samples. Eight of the ten leachable fluoride results are below the MCL of 4 mg/L. Based on these results, we concluded that the concrete that was used for backfill meets clean fill criteria, because contaminant concentrations do not adversely impact groundwater or public health.

As described in Table 6-4, numerous other concrete samples were analyzed during the investigation. Concrete associated with approximately one quarter of the samples was sent offsite for disposal at the Wasco County Landfill. This was based on concentrations of PAHs and arsenic, but not fluoride.

DEQ Should Not Issue An NFA Determination For The Site

DEQ's NFA decision would contravene EPA mandated cleanup standards applicable to the Site. As set forth above, the Record of Decision establishes a maximum fluoride level of 9.7 mg/L for the S-Aquifer and EPA's recent comment letter indicates that it might impose an even more stringent level of 4 mg/L. Because DEQ's proposed NFA determination would allow fluoride levels to persist far above these standards, such a determination would be wholly inappropriate. At the very least, the proposed NFA should be referred to EPA for a decision consistent with its history of regulatory action at the Site.

Response: DEQ's No Further Action determination is a technical conclusion that residual contamination at the Northwest Aluminum site does not exceed acceptable risk levels, as defined in Oregon statute, rules and guidance. It does not affect EPA's authority regarding the site.

DEQ's determination would also negatively impact Lockheed Martin. Lockheed Martin has been diligently performing OM&M at the facility under DEQ's supervision (and EPA's ultimate authority) for many years. DEQ should not issue an NFA to NAC for property at which Lockheed Martin is bound to Record of Decision-specified standards, especially given that NAC's recent operations appear to have frustrated these efforts. Lockheed Martin would be happy to meet with DEQ and NAC to discuss these issues. However, for the reasons set forth above, Lockheed Martin does not support issuance of the NFA.

Response: The recent investigation and cleanup resulted in the removal of 97,000 tons of hazardous and nonhazardous waste, including more than 50,000 tons of contaminated soil. The amount of contaminated soil due to activities before and after Northwest Aluminum began operations is not known. We believe this cleanup has had a significant positive impact on the Northwest Aluminum site and adjacent properties.

MAY 23, 2012 LETTER FROM DONNA FLOROM, ARCADIS

ARCADIS is submitting this letter in response to the public notice that Oregon Department of Environmental Quality (ODEQ) intends to finalize regarding the petition for the request for a No Further Action (NFA) determination on the above mentioned Northwest Aluminum Company (NAC) site. ARCADIS has concern with the issuance of the NFA based upon the discussions presented below.

A recent report of the remedial investigation, risk assessment and remedial activities indicates that localized areas of contamination in soil and groundwater remain at the NAC site (CH2MHill, 2012). Groundwater compliance monitoring associated with the Lockheed Martin Corporation (Lockheed Martin) RCRA and CERCLA landfills indicate elevated constituent concentrations in groundwater suggesting strongly that contamination in soils exists up-gradient of the landfills are of concern. The CH2MHill document presents data which indicates concentration levels of WAD cyanide and fluoride, respectively, exist at the NAC site up-gradient to the CERCLA landfill. Cyanide levels recorded at Lockheed Martin's CERCLA groundwater compliance monitoring well (MW-15S) reflect contamination from the up-gradient area of NAC MW-104, near the former Hard Pitch Sump location.

Response: The following discussion refers to figures and tables in the CH2M HILL report (see instructions at the beginning of this memo for access to this report on DEQ's website):

Lockheed well MW-15S and Northwest Aluminum well MW-104 are shown on Figure 6-3. A comparison of this figure with Figure 6-2 shows that this area corresponds to features of interest D, E, F, G, H and I. These features of interest are shown in Figure 6-2, but are more clearly labeled in Figure 5-1.

In response to this comment, the following paragraphs examine weak acid dissociable (WAD) cyanide and fluoride in soil and groundwater in this portion of the site:

Fluoride in groundwater: Groundwater results for the four Northwest Aluminum monitoring wells are found in Table 6-8b. As shown in that table, fluoride in well MW-104 was tested four times. It was not detected in any of the samples. The detection limit, 0.5 mg/L, is below the MCL of 4 mg/L.

WAD cyanide in groundwater: WAD cyanide was detected in well MW-104 during all four sampling events. Concentrations ranged from 0.0198 mg/L to 0.14 mg/L. These results are lower than the MCL of 0.2 mg/L.

Fluoride in soil: Soil sample results prior to cleanup are found in Table 6-5. (NOTE: As shown on Figure 6-2, sample locations for areas E, F and G all begin with the letter E). The maximum fluoride concentration in soil in these areas was 24,400 mg/kg (sample location E5). The mean concentration was 1,678 mg/kg. Additional excavation was conducting in 2010, after which verification samples E1V, E2V, E5V and E6V were collected. Sample locations are shown on Figure 8-1 and results are in Table 8-1. Fluoride concentrations ranged from 225 mg/kg to 2,170 mg/kg, with a mean concentration of 1,008 mg/kg. For reference, the soil remediation criterion specified in the ROD for fluoride is 2,200 mg/kg.

WAD cyanide in soil: The maximum WAD cyanide result in soil is 1.1 mg/kg. The mean WAD cyanide result for this area is 0.12 mg/kg. The ROD does not specify a cleanup target for cyanide in soil. For the Northwest Aluminum cleanup, a site-specific soil cleanup level of 40 mg/kg was calculated to prevent exceedances of the MCL in groundwater, as discussed in Appendix A-5.

Finally, it is also important to note that substantial soil removal was conducted in this area after the 2010 verification sample results. The cleanup addressed PAH levels in soil. As mentioned above, soil cleanup levels for the Northwest Aluminum cleanup were more stringent than those considered in the ROD. Confirmation sampling after the 2011 soil removal work was limited to PAHs, because other contaminants were already below acceptable levels. However, it is reasonable to assume that, as a result of this additional work, cyanide and fluoride levels in soil are now lower than presented above.

Based on this, we disagree with the comment that cyanide and fluoride in the vicinity of the hard pitch sump exceed acceptable risk levels, or soil cleanup criteria specified in the ROD. In addition, fluoride and cyanide in Lockheed Martin well MW-15S are below MCLs.

Similarly, the CH2MHill report documents a fluoride concentration of 34.6 mg/L in the NWA monitor well MW-103, directly up gradient of the CERCLA landfill.

Response: This is correct. As shown in Table 6-8b, fluoride in well MW-103 ranged from 23.6 to 34.6 mg/l during the four rounds of sampling. The highest result occurred during the first of these four sampling events. Although this elevated fluoride was discovered in 2010, we do not know how long this condition has existed, because the S aquifer was not previously sampled at this location.

Interestingly, three deeper wells (MW-16A, 16B and 16D) were installed at this location in 1986. Table 4.6 in the *Final Remedial Investigation Report* (Geraghty & Miller, 1988) shows that wells MW-16A and 16B were sampled twice, in August 1986 and August 1987. Fluoride results for MW-16A were 1.2 mg/L and <1.0 mg/L. Fluoride in MW-16B was found at concentrations of 4.2 mg/L and 1.4 mg/L. We suspect that fluoride at MW-16B was due to migration from MW-9B, as it is downgradient of MW-9. The MW-8 and MW-9 wells were removed by Lockheed in 2008 because they had been installed through waste and were suspected to have faulty construction. As a result, they may have provided conduits for contamination. (Note: Groundwater flow in the S aquifer is to the north. Groundwater elevation data in the A and B aquifers is somewhat inconclusive, but B aquifer groundwater appears to flow to the south.)

Based on extensive groundwater monitoring at the Lockheed Martin site, we conclude that fluoride concentrations higher than that found in MW-103 do not result in exceedances of MCLs or ACLs in the underlying A and B aquifers.

In terms of the potential for lateral migration of fluoride in the S aquifer, we have groundwater data from several downgradient S-aquifer wells (Lockheed wells MW-38S, 39S, 40S, 41S and 42S), as shown on Figure 6-3). Fluoride is below 1 mg/L in all these wells with the exception of MW-38, where fluoride has generally been between 2 and 5 mg/L. Note that MW-42, where fluoride levels are less than 1 mg/L, is between MW-103 and MW-38S.

Based on this information, we conclude that fluoride contamination is fairly localized, and drops to background concentrations within a distance that is no greater than the distance to these downgradient wells which is approximately 500 feet. While the beneficial water use determination shows that S aquifer groundwater is not used anywhere on or near the site, this is particularly true of the area bounded by these wells, which is occupied almost entirely by the CERCLA Landfill.

ARCADIS understands ODEQ's recommendation for a screening level of 72 mg/L for fluoride, 0.2 mg/L for free cyanide and 3,020 mg/L for sulfate for S Aquifer groundwater based upon the following ODEQ staff report:

"Fluoride was found in one S aquifer well at concentrations above MCLs. The S aquifer is not used for drinking water, nor is it anticipated that this aquifer will be used for drinking in the future. However, as a precaution, a voluntary deed restriction will be implemented prohibiting extraction of groundwater from the S aquifer for drinking water."

However, this recommendation is in contrast to the Alternate Concentration Limits (ACL) values established by Lockheed Martin's Record of Decision (ROD) which specifies the criteria of 9.7 mg/L fluoride, 0.770 mg/L free (WAD) cyanide and 3,020 mg/L sulfate. ARCADIS and Lockheed Martin face potential permit violations if groundwater monitoring concentration levels exceed the approved limits that are well below the concentration levels at the NAC site, as well as the recommended screening levels for NAC which ODEQ has determined to be protective of groundwater for the same aquifer system.

Additionally, EPA has indicated their position recently that Maximum Contaminant Levels (MCL), which are even more stringent, should be utilized as the groundwater screening levels rather than the ACLs specified in EPA's ROD and has expressed concern regarding the classification and beneficial use of the S aquifer as a potential drinking water source. These considerations are in stark contrast to language in the ODEQ NFA that suggests a new and higher ACL for fluoride and includes the determination that the S aquifer is unusable.

Given the Lockheed Martin site shares the same groundwater system, and is affected by any remaining constituents from the up-gradient NAC site, it is ARCADIS' opinion that the NFA petition be placed on hold until more coordination and communication occurs between ODEQ, EPA, Lockheed Martin and ARCADIS to discuss the issues presented above. The discussions should address similar considerations that would apply to the S Aquifer in an approach that would be consistent between the NAC and Lockheed Martin sites, such that Lockheed Martin site is not negatively impacted by remaining constituents that are above the required clean up standard for Lockheed Martin

Response: For reasons discussed in the preceding response, we conclude that fluoride found in MW-103 does not result in exceedances of the ACL (9.7 mg/L) in EPA's ROD or the MCL (4 mg/L) in any of the downgradient Lockheed wells. DEQ's No Further Action determination does not establish a new ACL; 72 mg/l is the acceptable risk level that is protective of deeper aquifers since the S aquifer is not currently or reasonably likely to be used as a drinking water source.

DEQ's No Further Action determination is a technical conclusion that residual contamination at the Northwest Aluminum site does not exceed acceptable risk levels, as defined in Oregon statute, rules and guidance. It does not affect EPA's authority regarding the site or change any cleanup levels in EPA's ROD.

MAY 23, 2012 EMAIL FROM LYNDEN PETERS, ARCADIS

Comment in regard to ODEQ's public notice that it intends to finalize the requirement for No Further Action Determination for the Former Northwest Aluminum Company (NAC) site at The Dalles, Oregon:

We understand ODEQ's reasoning for selecting groundwater screening levels for the NAC site based on the fact that the S Aquifer (as well as perched shallow groundwater) has not been used as a drinking water source, and would not be used at a drinking water source in the future.

As the adjacent Lockheed Martin Corporation (LMC) site shares the same groundwater system as the NAC site, similar considerations apply to the S Aquifer at this site and merit an approach that would be consistent between the two sites.

Response: Comment noted, but this is not a factor in determining whether the site meets Oregon's acceptable risk criteria.

MAY 23, 2012 EMAIL FROM MARSHA WALKER, PBS ENGINEERING & ENVIRONMENTAL

Following up on the voicemail I left yesterday, below are written comments on the proposed NFA determination for the Northwest Aluminum facility in The Dalles. These comments are based on our review of the Final Remediation, Risk Assessment and Remedial Action Report issued by CH2Mhill, March, 2012, and the DEQ Staff Report related to the Recommended No Further Action prepared in May 2012. We look forward to DEQ's response.

- Regarding the former Rectifier Yard (Feature of Interest [FOI] O), it appears that the soil PAH data from that cleanup was left out of the statistical calculations for site-wide residual PAH contamination. Is there an explanation for this? Also, the EPA accepted the self-guided cleanup of this area with regard to PCBs; is DEQ including the Rectifier Yard as part of the forthcoming NFA or is there a separate letter from DEQ addressing the effectiveness of the self-guided cleanup for both PCBs and PAHs? If not, please explain why.

Response: We appreciate the observation of an oversight regarding PAH data from the rectifier yard. In response, the Department requested that Northwest Aluminum evaluate the PAH data associated with rectifier yard samples, which were inadvertently overlooked. Means for the 19 additional PAH samples (with non-detect [ND] values quantified as one-half the laboratory reporting limit) were calculated and compared to the 90 percent upper confidence limit (UCL) values from the original 106 PAH samples. As can be seen by visual inspection of the data presented below (in mg/kg), the means of these additional data are either below or just at existing UCL values for individual compounds. The effect of adding these additional data would likely therefore be to not change, or to lower, the existing risk estimate, which was already within the acceptable range under Oregon's regulations.

	90%UCL (106 samples)	Mean (19 rectifier yard samples)
Acenaphthene	0.014	0.007
Acenaphthylene	0.004	0.005
Anthracene	0.036	0.016
Benzo (a) anthracene	0.375	0.114
Benzo (a) pyrene	0.344	0.122
Benzo (b) fluoranthene	0.653	0.229
Benzo (g,h,i) perylene	0.35	0.112
Benzo (k) fluoranthene	0.215	0.076
Chrysene	0.614	0.117
Dibenzo (a,h) anthracene	0.069	0.043
Fluoranthene	0.641	0.217
Fluorene	0.012	0.006
Indeno (1,2,3-cd) pyrene	0.28	0.105
Naphthalene	---	0.004
Phenanthrene	0.158	0.076
Pyrene	0.575	0.182

The Department intends to include the rectifier yard in the NFA determination based on the EPA-approved self-implementing PCB cleanup and the results of these PAH analyses.

- **Historical documents indicate FOI N includes both gasoline and diesel USTs. However, it appears that the historical sampling data doesn't include gasoline-range petroleum hydrocarbons in the analyses. Has this apparent data gap been considered by DEQ?**

Response: We appreciate this observation. In response to this comment, CH2M HILL determined that the primary lab (CH2M HILL Applied Science Laboratory) had subcontracted this analysis out to another lab (TestAmerica). TestAmerica analyzed a water sample and a soil sample from this location for gasoline-range hydrocarbons. The results were inadvertently omitted from Table 6-5 and Table 6-8a. No gasoline-range hydrocarbons were detected in either sample.

- **There appears to be a discrepancy between the area proposed for NFA (CH2MHill figure 11-2) and the tax lot boundaries in the area of FOI X. Specifically, it appears that FOI X has not been included within the area proposed for NFA. Is that accurate? If so, please explain why FOI X is not within the area proposed for NFA. Has there been a lot-**

line adjustment in this area such that FOI X is no longer within the tax lot boundaries covered by the NFA?

Response: During the Northwest Aluminum investigation, it was discovered that that the property line does not conform to the boundary of the scrubber sludge pond. Northwest Aluminum and Lockheed are therefore discussing adjusting the property boundary line so that this portion of the scrubber sludge pond and the area formerly occupied by an associated clarifier tank will be on Lockheed property. For this reason, this area is excluded from the area considered in the NFA determination.

- **Could the NWA monitoring wells potentially be decommissioned following an NFA decision? Does DEQ have a sense of whether some of the active Lockheed Martin monitoring wells that are located on the NWA site will also be closed or is it DEQ's understanding that EPA will continue to require all of those existing wells to continue to be monitored?**

Response: DEQ will allow Northwest Aluminum to decommission monitoring wells on their property and we do not identify any statutory requirement for them to maintain the wells. We do not plan to require further sampling at the four monitoring wells installed by Northwest Aluminum (MW-101 through 104). Currently, we are not aware of any plans to decommission any of the Lockheed monitoring wells.

The EPA's comments on DEQ's draft 4th Five-Year Review report refers to a "landfillette" and "historical clarifier." Where are these site features located and will these areas be covered by the proposed NFA?

Response: The "landfillette" was actually two small mounds of waste not incorporated into the CERCLA Landfill during the remedial action conducted in the early 1990s. Lockheed well clusters MW-8 and MW-9 were installed through these waste mounds. Contaminant detections in these wells were assumed to be due to faulty well construction and the fact that the wells were installed through waste. In 2008, these wells were decommissioned and replaced by well MW-42S. The waste, totaling approximately 2,500 tons, was disposed of at the hazardous waste landfill near Arlington, Oregon. This is on Lockheed property, and is not part of the area to be included in the NFA determination.

The historical clarifier is the circular tank between areas X and S (see Figure 5-1). As with the portion of the scrubber sludge ponds that extends onto Northwest Aluminum property, this area is excluded from the area to be included in the NFA determination, as shown in Figure 11-2.

- **If a future property owner wishes to place a production well in Aquifer A or B, would this be permitted under the proposed NFA?**

DEQ is not requiring restrictions on use of groundwater use in the A and B aquifers. If this were to be done, care should be taken when locating and constructing the well, to avoid the risk of contamination migrating down to the A or B aquifer through the well borehole.